

SEQUENCE LISTING

<110> CANFIELD, William
KORNFELD, Stuart

<120> EXPRESSION OF LYSOSOMAL HYDROLASE IN CELLS EXPRESSING PRO-N-
ACETYLGLUCOSAMINE-1-PHOSPHODIESTER ALPHA-N-ACETYL GLUCOSIMANIDASE

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<170> PatentIn version 3.1

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 <212> PRT
 <213> Homo sapiens

<400> 4

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Arg Tyr Gly Leu Tyr Val Cys Phe Leu Gly Val Val Val Thr Ile Val
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Ser Ala Phe Gln Phe Gly Glu Val Val Leu Glu Trp Ser Arg Asp Gln
 35 40 45

Tyr His Val Leu Phe Asp Ser Tyr Arg Asp Asn Ile Ala Gly Lys Ser
 50 55 60

Phe Gln Asn Arg Leu Cys Leu Pro Met Pro Ile Asp Val Val Tyr Thr
 65 70 75 80

Trp Val Asn Gly Thr Asp Leu Glu Leu Leu Lys Glu Leu Gln Gln Val
 85 90 95

Arg Glu Gln Met Glu Glu Glu Gln Lys Ala Met Arg Glu Ile Leu Gly
 100 105 110

Lys Asn Thr Thr Glu Pro Thr Lys Lys Ser Glu Lys Gln Leu Glu Cys
 115 120 125

Leu Leu Thr His Cys Ile Lys Val Pro Met Leu Val Leu Asp Pro Ala
130 135 140

Leu Pro Ala Asn Ile Thr Leu Lys Asp Val Pro Ser Leu Tyr Pro Ser
145 150 155 160

Phe His Ser Ala Ser Asp Ile Phe Asn Val Ala Lys Pro Lys Asn Pro
165 170 175

Ser Thr Asn Val Ser Val Val Val Phe Asp Ser Thr Lys Asp Val Glu
180 185 190

Asp Ala His Ser Gly Leu Leu Lys Gly Asn Ser Arg Gln Thr Val Trp
195 200 205

Arg Gly Tyr Leu Thr Thr Asp Lys Glu Val Pro Gly Leu Val Leu Met
210 215 220

Gln Asp Leu Ala Phe Leu Ser Gly Phe Pro Pro Thr Phe Lys Glu Thr
225 230 235 240

Asn Gln Leu Lys Thr Lys Leu Pro Glu Asn Leu Ser Ser Lys Val Lys
245 250 255

Leu Leu Gln Leu Tyr Ser Glu Ala Ser Val Ala Leu Leu Lys Leu Asn
260 265 270

Asn Pro Lys Asp Phe Gln Glu Leu Asn Lys Gln Thr Lys Lys Asn Met
275 280 285

Thr Ile Asp Gly Lys Glu Leu Thr Ile Ser Pro Ala Tyr Leu Leu Trp
290 295 300

Asp Leu Ser Ala Ile Ser Gln Ser Lys Gln Asp Glu Asp Ile Ser Ala
305 310 315 320

Ser Arg Phe Glu Asp Asn Glu Glu Leu Arg Tyr Ser Leu Arg Ser Ile
325 330 335

Glu Arg His Ala Pro Trp Val Arg Asn Ile Phe Ile Val Thr Asn Gly
340 345 350

Gln Ile Pro Ser Trp Leu Asn Leu Asp Asn Pro Arg Val Thr Ile Val
355 360 365

Thr His Gln Asp Val Phe Arg Asn Leu Ser His Leu Pro Thr Phe Ser
370 375 380

Ser Pro Ala Ile Glu Ser His Ile His Arg Ile Glu Gly Leu Ser Gln
385 390 395 400

Lys Phe Ile Tyr Leu Asn Asp Asp Val Met Phe Gly Lys Asp Val Trp
405 410 415

Pro Asp Asp Phe Tyr Ser His Ser Lys Gly Gln Lys Val Tyr Leu Thr
420 425 430

Trp Pro Val Pro Asn Cys Ala Glu Gly Cys Pro Gly Ser Trp Ile Lys
435 440 445

Asp Gly Tyr Cys Asp Lys Ala Cys Asn Asn Ser Ala Cys Asp Trp Asp
450 455 460

Gly Gly Asp Cys Ser Gly Asn Ser Gly Gly Ser Arg Tyr Ile Ala Gly
465 470 475 480

Gly Gly Gly Thr Gly Ser Ile Gly Val Gly His Pro Trp Gln Phe Gly
485 490 495

Gly Gly Ile Asn Ser Val Ser Tyr Cys Asn Gln Gly Cys Ala Asn Ser
500 505 510

Trp Leu Ala Asp Lys Phe Cys Asp Gln Ala Cys Asn Val Leu Ser Cys
515 520 525

Gly Phe Asp Ala Gly Asp Cys Gly Gln Asp His Phe His Glu Leu Tyr
530 535 540

Lys Val Ile Leu Leu Pro Asn Gln Thr His Tyr Ile Ile Pro Lys Gly
545 550 555 560

Glu Cys Leu Pro Tyr Phe Ser Phe Ala Glu Val Ala Lys Arg Gly Val
565 570 575

805 810 815
 Arg Val Glu Thr His Thr Gln Lys Thr Ile Gly Gly Asn Val Thr Lys
 820 825 830
 Glu Lys Pro Pro Ser Leu Ile Val Pro Leu Glu Ser Gln Met Thr Lys
 835 840 845
 Glu Lys Lys Ile Thr Gly Lys Glu Lys Glu Asn Ser Arg Met Glu Glu
 850 855 860
 Asn Ala Glu Asn His Ile Gly Val Thr Glu Val Leu Leu Gly Arg Lys
 865 870 875 880
 Leu Gln His Tyr Thr Asp Ser Tyr Leu Gly Phe Leu Pro Trp Glu Lys
 885 890 895
 Lys Lys Tyr Phe Gln Asp Leu Leu Asp Glu Glu Glu Ser Leu Lys Thr
 900 905 910
 Gln Leu Ala Tyr Phe Thr Asp Ser Lys Asn Thr Gly Arg Gln Leu Lys
 915 920 925
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 <211> 328
 <212> PRT
 <213> Homo sapiens
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 Lys Phe Gly Phe Thr Ser Arg Lys Val Pro Ala His Met Pro His Met
 20 25 30
 Ile Asp Arg Ile Val Met Gln Glu Leu Gln Asp Met Phe Pro Glu Glu
 35 40 45
 Phe Asp Lys Thr Ser Phe His Lys Val Arg His Ser Glu Asp Met Gln
 50 55 60
 Phe Ala Phe Ser Tyr Phe Tyr Tyr Leu Met Ser Ala Val Gln Pro Leu
 65 70 75 80

Asn Ile Ser Gln Val Phe Asp Glu Val Asp Thr Asp Gln Ser Gly Val
85 90 95

Leu Ser Asp Arg Glu Ile Arg Thr Leu Ala Thr Arg Ile His Glu Leu
100 105 110

Pro Leu Ser Leu Gln Asp Leu Thr Gly Leu Glu His Met Leu Ile Asn
115 120 125

Cys Ser Lys Met Leu Pro Ala Asp Ile Thr Gln Leu Asn Asn Ile Pro
130 135 140

Pro Thr Gln Glu Ser Tyr Tyr Asp Pro Asn Leu Pro Pro Val Thr Lys
145 150 155 160

Ser Leu Val Thr Asn Cys Lys Pro Val Thr Asp Lys Ile His Lys Ala
165 170 175

Tyr Lys Asp Lys Asn Lys Tyr Arg Phe Glu Ile Met Gly Glu Glu Glu
180 185 190

Ile Ala Phe Lys Met Ile Arg Thr Asn Val Ser His Val Val Gly Gln
195 200 205

Leu Asp Asp Ile Arg Lys Asn Pro Arg Lys Phe Val Cys Leu Asn Asp
210 215 220

Asn Ile Asp His Asn His Lys Asp Ala Gln Thr Val Lys Ala Val Leu
225 230 235 240

Arg Asp Phe Tyr Glu Ser Met Phe Pro Ile Pro Ser Gln Phe Glu Leu
245 250 255

Pro Arg Glu Tyr Arg Asn Arg Phe Leu His Met His Glu Leu Gln Glu
260 265 270

Trp Arg Ala Tyr Arg Asp Lys Leu Lys Phe Trp Thr His Cys Val Leu
275 280 285

Ala Thr Leu Ile Met Phe Thr Ile Phe Ser Phe Ala Glu Gln Leu
290 295 300

Ile Ala Leu Lys Arg Lys Ile Phe Pro Arg Arg Arg Ile His Lys Glu
 305 310 315 320

Ala Ser Pro Asn Arg Ile Arg Val
 325

<210> 6
 <211> 1219
 <212> DNA
 <213> Homo sapiens

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<210> 7
 <211> 305
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<400> 7

Met Ala Ala Gly Leu Ala Arg Leu Leu Leu Leu Gly Leu Ser Ala
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Gly Gly Pro Ala Pro Ala Gly Ala Ala Lys Met Lys Val Val Glu Glu
 20 25 30

Pro Asn Ala Phe Gly Val Asn Asn Pro Phe Leu Pro Gln Ala Ser Arg
 35 40 45

Leu Gln Ala Lys Arg Asp Pro Ser Pro Val Ser Gly Pro Val His Leu
 50 55 60

Phe Arg Leu Ser Gly Lys Cys Phe Ser Leu Val Glu Ser Thr Tyr Lys
 65 70 75 80

Tyr Glu Phe Cys Pro Phe His Asn Val Thr Gln His Glu Gln Thr Phe
 85 90 95

Arg Trp Asn Ala Tyr Ser Gly Ile Leu Gly Ile Trp His Glu Trp Glu
 100 105 110

Ile Ala Asn Asn Thr Phe Thr Gly Met Trp Met Arg Asp Gly Asp Ala
 115 120 125

Cys Arg Ser Arg Ser Arg Gln Ser Lys Val Glu Leu Ala Cys Gly Lys
 130 135 140

Ser Asn Arg Leu Ala His Val Ser Glu Pro Ser Thr Cys Val Tyr Ala
 145 150 155 160

Leu Thr Phe Glu Thr Pro Leu Val Cys His Pro His Ala Leu Leu Val
 165 170 175

Tyr Pro Thr Leu Pro Glu Ala Leu Gln Arg Gln Trp Asp Gln Val Glu
 180 185 190

Gln Asp Leu Ala Asp Glu Leu Ile Thr Pro Gln Gly His Glu Lys Leu
 195 200 205

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 aatggcacac atttttgtaa taagaacttg aaatgtaaat attgtgtttg tgctgtaaat 5160
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 aaaaaaaaaa 5229

<210> 9
 <211> 908
 <212> PRT
 <213> Mus musculus

<400> 9

Met Leu Phe Lys Leu Leu Gln Arg Gln Thr Tyr Thr Cys Leu Ser His
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Arg Tyr Gly Leu Tyr Val Cys Phe Val Gly Val Val Val Thr Ile Val
 20 25 30

Ser Ala Phe Gln Phe Gly Glu Val Val Leu Glu Trp Ser Arg Asp Gln
35 40 45

Tyr His Val Leu Phe Asp Ser Tyr Arg Asp Asn Ile Ala Gly Lys Ser
50 55 60

Phe Gln Asn Arg Leu Cys Leu Pro Met Pro Ile Asp Val Val Tyr Thr
65 70 75 80

Trp Val Asn Gly Thr Asp Leu Glu Leu Leu Lys Glu Leu Gln Gln Val
85 90 95

Arg Glu His Met Glu Glu Glu Gln Arg Ala Met Arg Glu Thr Leu Gly
100 105 110

Lys Asn Thr Thr Glu Pro Thr Lys Lys Ser Glu Lys Gln Leu Glu Cys
115 120 125

Leu Leu Thr His Cys Ile Lys Val Pro Met Leu Val Leu Asp Pro Ala
130 135 140

Leu Pro Ala Thr Ile Thr Leu Lys Asp Leu Pro Thr Leu Tyr Pro Ser
145 150 155 160

Phe His Ala Ser Ser Asp Met Phe Asn Val Ala Lys Pro Lys Asn Pro
165 170 175

Ser Thr Asn Val Pro Val Val Val Phe Asp Thr Thr Lys Asp Val Glu
180 185 190

Asp Ala His Ala Gly Pro Phe Lys Gly Gly Gln Gln Thr Asp Val Trp
195 200 205

Arg Ala Tyr Leu Thr Thr Asp Lys Asp Ala Pro Gly Leu Val Leu Ile
210 215 220

Gln Gly Leu Ala Phe Leu Ser Gly Phe Pro Pro Thr Phe Lys Glu Thr
225 230 235 240

Ser Gln Leu Lys Thr Lys Leu Pro Arg Lys Ala Phe Pro Leu Lys Ile
245 250 255

Lys Leu Leu Arg Leu Tyr Ser Glu Ala Ser Val Ala Leu Leu Lys Leu

260	265	270
Asn Asn Pro Lys Gly Phe Gln Glu Leu Asn Lys Gln Thr Lys Lys Asn 275 280		
Met Thr Ile Asp Gly Lys Glu Leu Thr Ile Ser Pro Ala Tyr Leu Leu 290 295 300		
Trp Asp Leu Ser Ala Ile Ser Gln Ser Lys Gln Asp Glu Asp Ala Ser 305 310 315 320		
Ala Ser Arg Phe Glu Asp Asn Glu Glu Leu Arg Tyr Ser Leu Arg Ser 325 330 335		
Ile Glu Arg His Ala Pro Trp Val Arg Asn Ile Phe Ile Val Thr Asn 340 345 350		
Gly Gln Ile Pro Ser Trp Leu Asn Leu Asp Asn Pro Arg Val Thr Ile 355 360 365		
Val Thr His Gln Asp Ile Phe Gln Asn Leu Ser His Leu Pro Thr Phe 370 375 380		
Ser Ser Pro Ala Ile Glu Ser His Ile His Arg Ile Glu Gly Leu Ser 385 390 395 400		
Gln Lys Phe Ile Tyr Leu Asn Asp Asp Val Met Phe Gly Lys Asp Val 405 410 415		
Trp Pro Asp Asp Phe Tyr Ser His Ser Lys Gly Gln Lys Val Tyr Leu 420 425 430		
Thr Trp Pro Val Pro Asn Cys Ala Glu Gly Cys Pro Gly Ser Trp Ile 435 440 445		
Lys Asp Gly Tyr Cys Asp Lys Ala Cys Asn Thr Ser Pro Cys Asp Trp 450 455 460		
Asp Gly Gly Asn Cys Ser Gly Asn Thr Ala Gly Asn Arg Phe Val Ala 465 470 475 480		
Arg Gly Gly Gly Thr Gly Asn Ile Gly Ala Gly Gln His Trp Gln Phe 485 490 495		

Gly Gly Gly Ile Asn Thr Ile Ser Tyr Cys Asn Gln Gly Cys Ala Asn
500 505 510

Ser Trp Leu Ala Asp Lys Phe Cys Asp Gln Ala Cys Asn Val Leu Ser
515 520 525

Cys Gly Phe Asp Ala Gly Asp Cys Gly Gln Asp His Phe His Glu Leu
530 535 540

Tyr Lys Val Thr Leu Leu Pro Asn Gln Thr His Tyr Val Val Pro Lys
545 550 555 560

Gly Glu Tyr Leu Ser Tyr Phe Ser Phe Ala Asn Ile Ala Arg Lys Arg
565 570 575

Ile Glu Gly Thr Tyr Ser Asp Asn Pro Ile Ile Arg His Ala Ser Ile
580 585 590

Ala Asn Lys Trp Lys Thr Leu His Leu Ile Met Pro Gly Gly Met Asn
595 600 605

Ala Thr Thr Ile Tyr Phe Asn Leu Thr Leu Gln Asn Ala Asn Asp Glu
610 615 620

Glu Phe Lys Ile Gln Ile Ala Val Glu Val Asp Thr Arg Glu Ala Pro
625 630 635 640

Lys Leu Asn Ser Thr Thr Gln Lys Ala Tyr Glu Ser Leu Val Ser Pro
645 650 655

Val Thr Pro Leu Pro Gln Ala Asp Val Pro Phe Glu Asp Val Pro Lys
660 665 670

Glu Lys Arg Phe Pro Lys Ile Arg Arg His Asp Val Asn Ala Thr Gly
675 680 685

Arg Phe Gln Glu Glu Val Lys Ile Pro Arg Val Asn Ile Ser Leu Leu
690 695 700

Pro Lys Glu Ala Gln Val Arg Leu Ser Asn Leu Asp Leu Gln Leu Glu
705 710 715 720

Arg Gly Asp Ile Thr Leu Lys Gly Tyr Asn Leu Ser Lys Ser Ala Leu
725 730 735

Leu Arg Ser Phe Leu Gly Asn Ser Leu Asp Thr Lys Ile Lys Pro Gln
740 745 750

Ala Arg Thr Asp Glu Thr Lys Gly Asn Leu Glu Val Pro Gln Glu Asn
755 760 765

Pro Ser His Arg Arg Pro His Gly Phe Ala Gly Glu His Arg Ser Glu
770 775 780

Arg Trp Thr Ala Pro Ala Glu Thr Val Thr Val Lys Gly Arg Asp His
785 790 795 800

Ala Leu Asn Pro Pro Val Leu Glu Thr Asn Ala Arg Leu Ala Gln
805 810 815

Pro Thr Leu Gly Val Thr Val Ser Lys Glu Asn Leu Ser Pro Leu Ile
820 825 830

Val Pro Pro Glu Ser His Leu Pro Lys Glu Glu Glu Ser Asp Arg Ala
835 840 845

Glu Gly Asn Ala Val Pro Val Lys Glu Leu Val Pro Gly Arg Arg Leu
850 855 860

Gln Gln Asn Tyr Pro Gly Phe Leu Pro Trp Glu Lys Lys Lys Tyr Phe
865 870 875 880

Gln Asp Leu Leu Asp Glu Glu Glu Ser Leu Lys Thr Gln Leu Ala Tyr
885 890 895

Phe Thr Asp Arg Lys His Thr Gly Arg Gln Leu Lys
900 905

<210> 10
<211> 328
<212> PRT
<213> Mus musculus

<400> 10

Asp Thr Phe Ala Asp Ser Leu Arg Tyr Val Asn Lys Ile Leu Asn Ser

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 Lys Phe Gly Phe Thr Ser Arg Lys Val Pro Ala His Met Pro His Met
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 Ile Asp Arg Ile Val Met Gln Glu Leu Gln Asp Met Phe Pro Glu Glu
 35 40 45
 Phe Asp Lys Thr Ser Phe His Lys Val Arg His Ser Glu Asp Met Gln
 50 55 60
 Phe Ala Phe Ser Tyr Phe Tyr Tyr Leu Met Ser Ala Val Gln Pro Leu
 65 70 75 80
 Asn Ile Ser Gln Val Phe His Glu Val Asp Thr Asp Gln Ser Gly Val
 85 90 95
 Leu Ser Asp Arg Glu Ile Arg Thr Leu Ala Thr Arg Ile His Asp Leu
 100 105 110
 Pro Leu Ser Leu Gln Asp Leu Thr Gly Leu Glu His Met Leu Ile Asn
 115 120 125
 Cys Ser Lys Met Leu Pro Ala Asn Ile Thr Gln Leu Asn Asn Ile Pro
 130 135 140
 Pro Thr Gln Glu Ala Tyr Tyr Asp Pro Asn Leu Pro Pro Val Thr Lys
 145 150 155 160
 Ser Leu Val Thr Asn Cys Lys Pro Val Thr Asp Lys Ile His Lys Ala
 165 170 175
 Tyr Lys Asp Lys Asn Lys Tyr Arg Phe Glu Ile Met Gly Glu Glu Glu
 180 185 190
 Ile Ala Phe Lys Met Ile Arg Thr Asn Val Ser His Val Val Gly Gln
 195 200 205
 Leu Asp Asp Ile Arg Lys Asn Pro Arg Lys Phe Val Cys Leu Asn Asp
 210 215 220
 Asn Ile Asp His Asn His Lys Asp Ala Arg Thr Val Lys Ala Val Leu
 225 230 235 240

Arg Asp Phe Tyr Glu Ser Met Phe Pro Ile Pro Ser Gln Phe Glu Leu
245 250 255

Pro Arg Glu Tyr Arg Asn Arg Phe Leu His Met His Glu Leu Gln Glu
260 265 270

Trp Arg Ala Tyr Arg Asp Lys Leu Lys Phe Trp Thr His Cys Val Leu
275 280 285

Ala Thr Leu Ile Ile Phe Thr Ile Phe Ser Phe Phe Ala Glu Gln Ile
290 295 300

Ile Ala Leu Lys Arg Lys Ile Phe Pro Arg Arg Arg Ile His Lys Glu
305 310 315 320

Ala Ser Pro Asp Arg Ile Arg Val
325

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<211> 2070
<212> DNA
<213> Mus musculus

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ttttaattaa	aaaaaaaaaa	aaaggaattc				2070

<210> 12
 <211> 307
 <212> PRT
 <213> Mus musculus

<400> 12

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Pro Asn Thr Phe Gly Leu Asn Asn Pro Phe Leu Pro Gln Ala Ser Arg
35 40 45

Leu Gln Pro Lys Arg Glu Pro Ser Ala Val Ser Gly Pro Leu His Leu
50 55 60

Phe Arg Leu Ala Gly Lys Cys Phe Ser Leu Val Glu Ser Thr Tyr Lys
65 70 75 80

Tyr Glu Phe Cys Pro Phe His Asn Val Thr Gln His Glu Gln Thr Phe
85 90 95

Arg Trp Asn Ala Tyr Ser Gly Ile Leu Gly Ile Trp His Glu Trp Glu
100 105 110

Ile Ile Asn Asn Thr Phe Lys Gly Met Trp Met Thr Asp Gly Asp Ser
115 120 125

Cys His Ser Arg Ser Arg Gln Ser Lys Val Glu Leu Thr Cys Gly Lys
130 135 140

Ile Asn Arg Leu Ala His Val Ser Glu Pro Ser Thr Cys Val Tyr Ala
145 150 155 160

Leu Thr Phe Glu Thr Pro Leu Val Cys His Pro His Ser Leu Leu Val
165 170 175

Tyr Pro Thr Leu Ser Glu Ala Leu Gln Gln Arg Leu Asp Gln Val Glu
180 185 190

Gln Asp Leu Ala Asp Glu Leu Ile Thr Pro Gln Gly Tyr Glu Lys Leu
195 200 205

Leu Arg Val Leu Phe Glu Asp Ala Gly Tyr Leu Lys Val Pro Gly Glu
210 215 220

Thr His Pro Thr Gln Leu Ala Gly Gly Ser Lys Gly Leu Gly Leu Glu
225 230 235 240

Thr Leu Asp Asn Cys Arg Lys Ala His Ala Glu Leu Ser Gln Glu Val
245 250 255

Gln Arg Leu Thr Ser Leu Leu Gln Gln His Gly Ile Pro His Thr Gln
260 265 270

Pro Thr Glu Thr Thr His Ser Gln His Leu Gly Gln Gln Leu Pro Ile
275 280 285

Gly Ala Ile Ala Ala Glu His Leu Arg Ser Asp Pro Gly Leu Arg Gly
290 295 300

Asn Ile Leu
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<212> DNA
<213> Rattus rattus

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taaccocaaa ggtttccccc agctgaacaa gcagaccaag aagaacatga gcatcagtg 180
gaaggaactg gccatcagcc ctgcctatct gctgtgggac ctgagcgcca tcagccagtc 240
caagcaggat gaagatgtgt ctgccagccg cttcgaggat aacgaagagc tgaggtactc 300
actgagatct atcgagagac atgattccat gagtctctta tgaattctgg ccatacttc 360
aatcatgac tcagtagtat tcctctgaaa tggcacacat ttttctaag agaacttgaa 420
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<210> 14
<211> 113
<212> PRT
<213> Rattus rattus

<400> 14

Phe Pro Pro Thr Phe Lys Glu Thr Ser Gln Leu Lys Thr Lys Leu Pro
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Glu Asn Leu Ser Ser Lys Ile Lys Leu Leu Gln Leu Tyr Ser Glu Ala
 20 25 30

Ser Val Ala Leu Leu Lys Leu Asn Asn Pro Lys Gly Phe Pro Glu Leu
 35 40 45

Asn Lys Gln Thr Lys Lys Asn Met Ser Ile Ser Gly Lys Glu Leu Ala
 50 55 60

Ile Ser Pro Ala Tyr Leu Leu Trp Asp Leu Ser Ala Ile Ser Gln Ser
 65 70 75 80

Lys Gln Asp Glu Asp Val Ser Ala Ser Arg Phe Glu Asp Asn Glu Glu
 85 90 95

Leu Arg Tyr Ser Leu Arg Ser Ile Glu Arg His Asp Ser Met Ser Pro
 100 105 110

Leu

<210> 15
 <211> 1105
 <212> DNA
 <213> Drosophila melanogaster

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 <223> n is a, g, t, or c

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 <223> n is a, g, t, or c

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 <222> (1023)..(1023)
 <223> n is a, g, t, or c

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 <222> (1035)..(1035)
 <223> n is a, g, t, or c

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<220>
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<223> n is a, g, t, or c

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<220>
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<222> (1100)..(1100)
<223> n is a, g, t, or c

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ccaagtgtgc tggatctcag ctacgaaagg gtcacggtgg tgccccacga agtctctggt 180
cccgatcccg accagctgcc caccttctcc agctcggcca tcgagacatt tctgcaccgc 240
ataccaaagc tgtccaagag gttcctctac ctcaacgacg acatattctc gggagctccg 300
ctgtatcccg aggacttgta cactgaagcg gagggagtgc gcgtgtacca ggcattggatg 360
gtgcccgggt gcgccttgga ttgcccctgg acgtacatag gtgatggagc ttgcgatccg 420
cactgcaaca ttgatgcgtg ccaatttgat ggaggcgact gcagtgaaac tgggccagcg 480
agcgatgcc acgtcattcc accaagcaaa gaagtgcctcg aggtgcagcc tgccgctggt 540
ccacaatcaa gagtccaccg atttctctag atgggtctcc aaaagctggt caggcgcgagc 600
tctgccaatt ttaaggatgt tatcgggcac cgcaatgtgt ccacactcaa ggaactacgt 660
cgcattgtgg agcgctttaa caaggccaaa ctcatgtcgc tgaaccccgga actggagacc 720
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gangccatgc aacgacgttt taccagcgaa ttctngacac tggccattaa cgctttccga 960
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<210> 16
<211> 502
<212> PRT

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<213> Drosophila melanogaster

<400> 16

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Ser Leu Glu Lys His Ala Ala Trp Ile Arg His Val Tyr Ile Val Thr
20 25 30

Asn Gly Gln Ile Pro Ser Trp Leu Asp Leu Ser Tyr Glu Arg Val Thr
35 40 45

Val Val Pro His Glu Val Leu Ala Pro Asp Pro Asp Gln Leu Pro Thr
50 55 60

Phe Ser Ser Ser Ala Ile Glu Thr Phe Leu His Arg Ile Pro Lys Leu
65 70 75 80

Ser Lys Arg Phe Leu Tyr Leu Asn Asp Asp Ile Phe Leu Gly Ala Pro
85 90 95

Leu Tyr Pro Glu Asp Leu Tyr Thr Glu Ala Glu Gly Val Arg Val Tyr
100 105 110

Gln Ala Trp Met Val Pro Gly Cys Ala Leu Asp Cys Pro Trp Thr Tyr
115 120 125

Ile Gly Asp Gly Ala Cys Asp Arg His Cys Asn Ile Asp Ala Cys Gln
130 135 140

Phe Asp Gly Gly Asp Cys Ser Glu Thr Gly Pro Ala Ser Asp Ala His
145 150 155 160

Val Ile Pro Pro Ser Lys Glu Val Leu Glu Val Gln Pro Ala Ala Val
165 170 175

Pro Gln Ser Arg Val His Arg Phe Pro Gln Met Gly Leu Gln Lys Leu
180 185 190

Phe Arg Arg Ser Ser Ala Asn Phe Lys Asp Val Met Arg His Arg Asn
195 200 205

Val Ser Thr Leu Lys Glu Leu Arg Arg Ile Val Glu Arg Phe Asn Lys

210 215 220
 Ala Lys Leu Met Ser Leu Asn Pro Glu Leu Glu Thr Ser Ser Ser Glu
 225 230 235 240
 Pro Gln Thr Thr Gln Arg His Gly Leu Arg Lys Glu Asp Phe Lys Ser
 245 250 255
 Ser Thr Asp Ile Tyr Ser His Ser Leu Ile Ala Thr Asn Met Leu Leu
 260 265 270
 Asn Arg Ala Tyr Gly Phe Lys Ala Arg His Val Leu Ala His Val Gly
 275 280 285
 Phe Leu Ile Asp Lys Asp Ile Val Glu Ala Met Gln Arg Arg Phe His
 290 295 300
 Gln Gln Ile Leu Asp Thr Ala His Gln Arg Phe Arg Ala Pro Thr Asp
 305 310 315 320
 Leu Gln Tyr Ala Phe Ala Tyr Tyr Ser Phe Leu Met Ser Glu Thr Lys
 325 330 335
 Val Met Ser Val Glu Glu Ile Phe Asp Glu Phe Asp Thr Asp Gly Ser
 340 345 350
 Ala Thr Trp Ser Asp Arg Glu Val Arg Thr Phe Leu Thr Arg Ile Tyr
 355 360 365
 Gln Pro Pro Leu Asp Trp Ser Ala Met Arg Tyr Phe Glu Glu Val Val
 370 375 380
 Gln Asn Cys Thr Arg Asn Leu Gly Met His Leu Lys Val Asp Thr Val
 385 390 395 400
 Glu His Ser Thr Leu Val Tyr Glu Arg Tyr Glu Asp Ser Asn Leu Pro
 405 410 415
 Thr Ile Thr Arg Asp Leu Val Val Arg Cys Pro Leu Leu Ala Glu Ala
 420 425 430
 Leu Ala Ala Asn Phe Ala Val Arg Pro Lys Tyr Asn Phe His Val Ser
 435 440 445

Pro Lys Arg Thr Ser His Ser Asn Phe Met Met Leu Thr Ser Asn Leu
450 455 460

Thr Glu Val Val Glu Ser Leu Asp Arg Leu Arg Arg Asn Pro Arg Lys
465 470 475 480

Phe Asn Cys Ile Asn Asp Asn Leu Asp Ala Asn Arg Gly Glu Asp Asn
485 490 495

Glu Asp Gly Ala Pro Ser
500

<210> 17
<211> 2183
<212> DNA
<213> Homo sapiens

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ccacgcgcgc gcgcgcgcct ccccccggac tgcacacggg tgcgcgccgg caaccgcgag 180
cacgagagtt ggcctccgcc tcccgcgact ccgcgcgcgc gcggtctggc cgtgcgcacc 240
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Asp Asp Asp Leu Leu Leu Pro Tyr Pro Arg Ala Arg Ala Arg Leu Pro
 35 40 45

Arg Asp Cys Thr Arg Val Arg Ala Gly Asn Arg Glu His Glu Ser Trp
 50 55 60

Pro Pro Pro Pro Ala Thr Pro Gly Ala Gly Gly Leu Ala Val Arg Thr
 65 70 75 80

Phe Val Ser His Phe Arg Asp Arg Ala Val Ala Gly His Leu Thr Arg
 85 90 95

Ala Val Glu Pro Leu Arg Thr Phe Ser Val Leu Glu Pro Gly Gly Pro
 100 105 110

Gly Gly Cys Ala Ala Arg Arg Arg Ala Thr Val Glu Glu Thr Ala Arg
 115 120 125

Ala Ala Asp Cys Arg Val Ala Gln Asn Gly Gly Phe Phe Arg Met Asn
 130 135 140

Ser Gly Glu Cys Leu Gly Asn Val Val Ser Asp Glu Arg Arg Val Ser
 145 150 155 160

Ser Ser Gly Gly Leu Gln Asn Ala Gln Phe Gly Ile Arg Arg Asp Gly
 165 170 175

Thr Leu Val Thr Gly Tyr Leu Ser Glu Glu Glu Val Leu Asp Thr Glu
 180 185 190

Asn Pro Phe Val Gln Leu Leu Ser Gly Val Val Trp Leu Ile Arg Asn
 195 200 205

Gly Ser Ile Tyr Ile Asn Glu Ser Gln Ala Thr Glu Cys Asp Glu Thr
 210 215 220

Gln Glu Thr Gly Ser Phe Ser Lys Phe Val Asn Val Ile Ser Ala Arg
 225 230 235 240

Thr Ala Ile Gly His Asp Arg Lys Gly Gln Leu Val Leu Phe His Ala
 245 250 255

Asp Gly His Thr Glu Gln Arg Gly Ile Asn Leu Trp Glu Met Ala Glu

260

265

270

Phe Leu Leu Lys Gln Asp Val Val Asn Ala Ile Asn Leu Asp Gly Gly
275 . 280 285

Gly Ser Ala Thr Phe Val Leu Asn Gly Thr Leu Ala Ser Tyr Pro Ser
290 295 300

Asp His Cys Gln Asp Asn Met Trp Arg Cys Pro Arg Gln Val Ser Thr
305 310 315 320

Val Val Cys Val His Glu Pro Arg Cys Gln Pro Pro Asp Cys His Gly
325 330 335

His Gly Thr Cys Val Asp Gly His Cys Gln Cys Thr Gly His Phe Trp
340 345 350

Arg Gly Pro Gly Cys Asp Glu Leu Asp Cys Gly Pro Ser Asn Cys Ser
355 360 365

Gln His Gly Leu Cys Thr Glu Thr Gly Cys Arg Cys Asp Ala Gly Trp
370 375 380

Thr Gly Ser Asn Cys Ser Glu Glu Cys Pro Leu Gly Trp His Gly Pro
385 390 395 400

Gly Cys Gln Arg Arg Cys Lys Cys Glu His His Cys Pro Cys Asp Pro
405 410 415

Lys Thr Gly Asn Cys Ser Val Ser Arg Val Lys Gln Cys Leu Gln Pro
420 425 430

Pro Glu Ala Thr Leu Arg Ala Gly Glu Leu Ser Phe Phe Thr Arg Thr
435 440 445

Ala Trp Leu Ala Leu Thr Leu Ala Leu Ala Phe Leu Leu Leu Ile Ser
450 455 460

Ile Ala Ala Asn Leu Ser Leu Leu Leu Ser Arg Ala Glu Arg Asn Arg
465 470 475 480

Arg Leu His Gly Asp Tyr Ala Tyr His Pro Leu Gln Glu Met Asn Gly
485 490 495

Glu Pro Leu Ala Ala Glu Lys Glu Gln Pro Gly Gly Ala His Asn Pro
500 505 510

Phe Lys Asp
515

<210> 19
<211> 2005
<212> DNA
<213> Mus musculus

<400> 19
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gccaccacag aaccccgggc gccaaagccac cagcgggccc tgcgcacctt cgtgtcgcac 180
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<210> 20

<211> 492

<212> PRT

<213> Mus musculus

<400> 20

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Glu Ser Trp Pro Pro Pro Pro Leu Ala Thr His Glu Pro Arg Ala Pro
 35 40 45

Ser His His Ala Ala Val Arg Thr Phe Val Ser His Phe Glu Gly Arg
 50 55 60

Ala Val Ala Gly His Leu Thr Arg Val Ala Asp Pro Leu Arg Thr Phe
 65 70 75 80

Ser Val Leu Glu Pro Gly Gly Ala Gly Gly Cys Gly Gly Arg Ser Ala
 85 90 95

Ala Ala Thr Val Glu Asp Thr Ala Val Arg Ala Gly Cys Arg Ile Ala
100 105 110

Gln Asn Gly Gly Phe Phe Arg Met Ser Thr Gly Glu Cys Leu Gly Asn
115 120 125

Val Val Ser Asp Gly Arg Leu Val Ser Ser Ser Gly Gly Leu Gln Asn
130 135 140

Ala Gln Phe Gly Ile Arg Arg Asp Gly Thr Ile Val Thr Gly Ser Cys
145 150 155 160

Leu Glu Glu Glu Val Leu Asp Pro Val Asn Pro Phe Val Gln Leu Leu
165 170 175

Ser Gly Val Val Trp Leu Ile Arg Asn Gly Asn Ile Tyr Ile Asn Glu
180 185 190

Ser Gln Ala Ile Glu Cys Asp Glu Thr Gln Glu Thr Gly Ser Phe Ser
195 200 205

Lys Phe Val Asn Val Met Ser Ala Arg Thr Ala Val Gly His Asp Arg
210 215 220

Glu Gly Gln Leu Ile Leu Phe His Ala Asp Gly Gln Thr Glu Gln Arg
225 230 235 240

Gly Leu Asn Leu Trp Glu Met Ala Glu Phe Leu Arg Gln Gln Asp Val
245 250 255

Val Asn Ala Ile Asn Leu Asp Gly Gly Gly Ser Ala Thr Phe Val Leu
260 265 270

Asn Gly Thr Leu Ala Ser Tyr Pro Ser Asp His Cys Gln Asp Asn Met
275 280 285

Trp Arg Cys Pro Arg Gln Val Ser Thr Val Val Cys Val His Glu Pro
290 295 300

Arg Cys Gln Pro Pro Asp Cys Ser Gly His Gly Thr Cys Val Asp Gly
305 310 315 320

His Cys Glu Cys Thr Ser His Phe Trp Arg Gly Glu Ala Cys Ser Glu
325 330 335

Leu Asp Cys Gly Pro Ser Asn Cys Ser Gln His Gly Leu Cys Thr Ala
340 345 350

Gly Cys His Cys Asp Ala Gly Trp Thr Gly Ser Asn Cys Ser Glu Glu
355 360 365

Cys Pro Leu Gly Trp Tyr Gly Pro Gly Cys Gln Arg Pro Cys Gln Cys
370 375 380

Glu His Gln Cys Phe Cys Asp Pro Gln Thr Gly Asn Cys Ser Ile Ser
385 390 395 400

Gln Val Arg Gln Cys Leu Gln Pro Thr Glu Ala Thr Pro Arg Ala Gly
405 410 415

Glu Leu Ala Ser Phe Thr Arg Thr Trp Leu Ala Leu Thr Leu Thr
420 425 430

Leu Ile Phe Leu Leu Leu Ile Ser Thr Gly Val Asn Val Ser Leu Phe
435 440 445

Leu Gly Ser Arg Ala Glu Arg Asn Arg His Leu Asp Gly Asp Tyr Val
450 455 460

Tyr His Pro Leu Gln Glu Val Asn Gly Glu Ala Leu Thr Ala Glu Lys
465 470 475 480

Glu His Met Glu Glu Thr Ser Asn Pro Phe Lys Asp
485 490

<210> 21
<211> 9792
<212> DNA
<213> Mus musculus

<400> 21
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